

Exploring Land Processes and Climate Variations through Giovanni

Suhung Shen and James Acker

Remotely Sensed Land Products in Giovanni

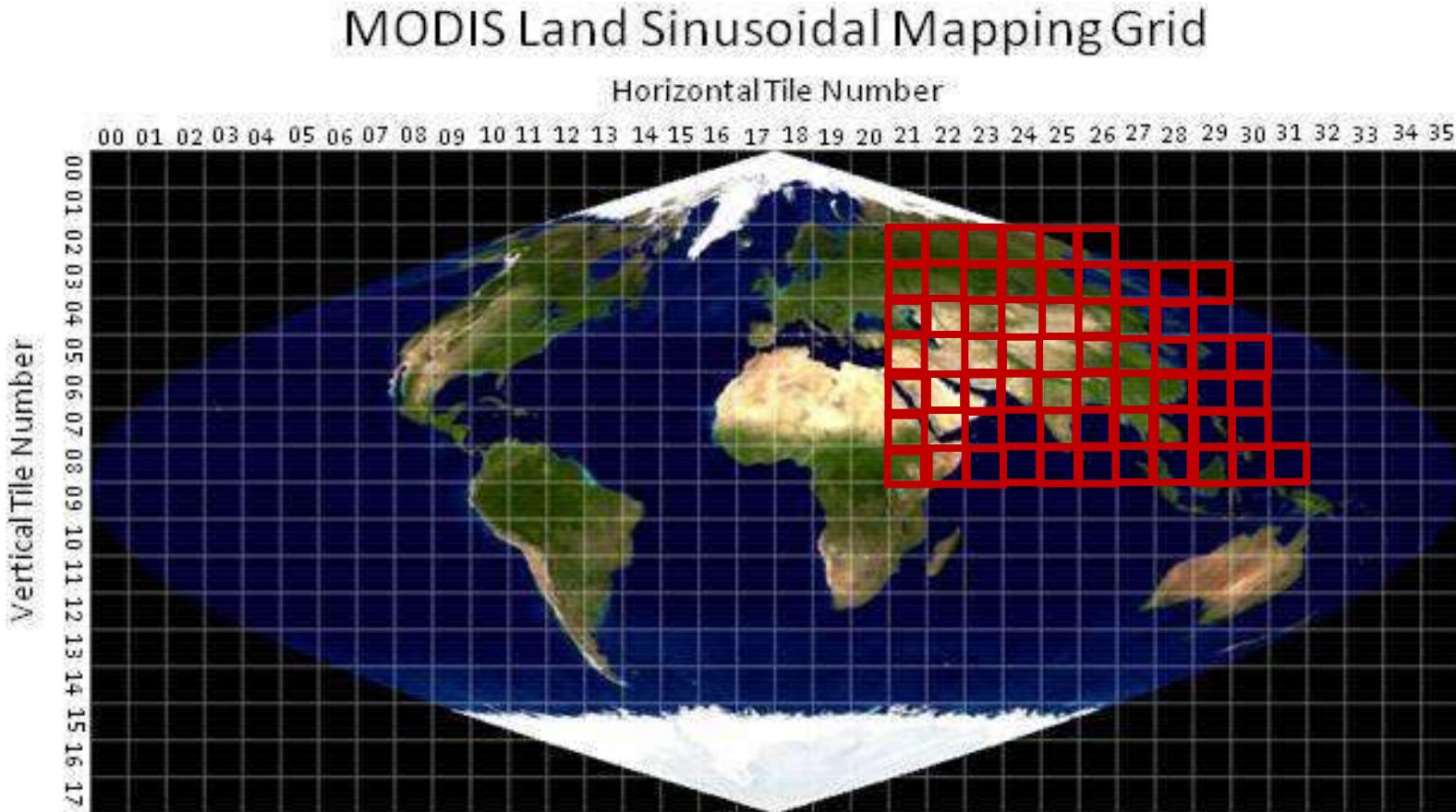
- Land Cover Types/Dynamics (MODIS)
- Vegetation Index (MODIS)
- Land Surface Temperatures (MODIS)
- Soil Moisture (AMSR-E)
- Snow/Ice Occurrence Frequency (NESDIS/IMS)
- Active Fires (MODIS)
- Surface Albedo (MODIS)
- Nighttime Lights (DMSP-OLS)

<http://disc.sci.gsfc.nasa.gov/mairs/data-holdings>

Spatial Resolutions of Products

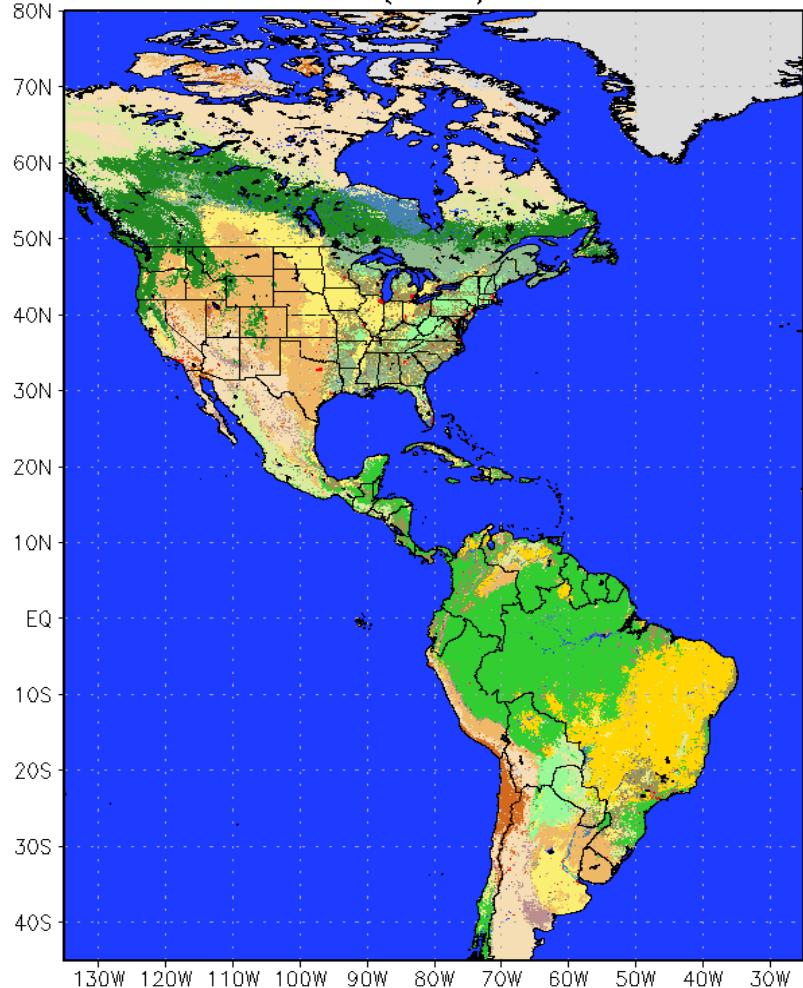
- **Low resolution:** 1x1 deg (LST, VI, Fire, Soil Moisture, Snow/Ice), global coverage , spatially aggregated from original global higher resolution data (mostly 0.05x0.05 deg)
- **Medium resolution:** 0.05x0.05 deg (LST, VI, Albedo), global coverage , standard products created by science team
- **Higher resolution:** 1x1 km (LST, Fire) or 0.5x0.5 km (Land Cover Types) over Asian region only (0° - 60° N, 60° E- 150° E) , processed from original tiled data files and projected to cylindrical equidistance map projection

Preprocessing Higher Resolution Data



MODIS Land Cover Types at 5.6km Resolution

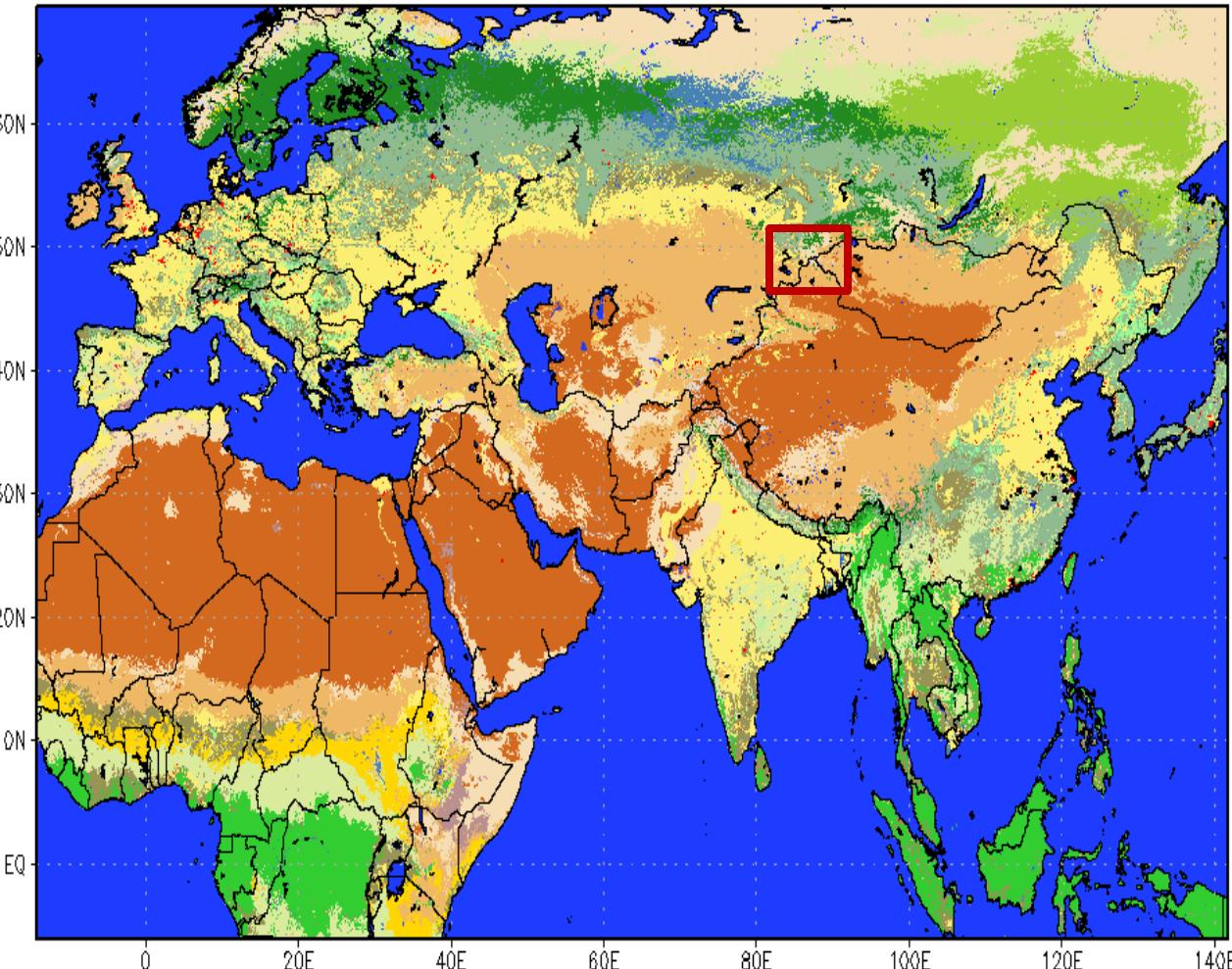
12C1.005 Majority Land Cover Types (IGBP) 5.6km [class]
(2009)



- 16=barren_sparse_vegetated
- 15=snow/ice
- 14=cropland/natural_mosaic
- 13=urban_built-up
- 12=croplands
- 11=permanent_wetlands
- 10=grasslands
- 9=savannas
- 8=woody_savannas
- 7=open_shrublands
- 6=closed_shrublands
- 5=mixed_forest
- 4=deciduous_broadleaf
- 3=deciduous_needleleaf
- 2=evergreen_broadleaf
- 1=evergreen_needleleaf
- 0=water

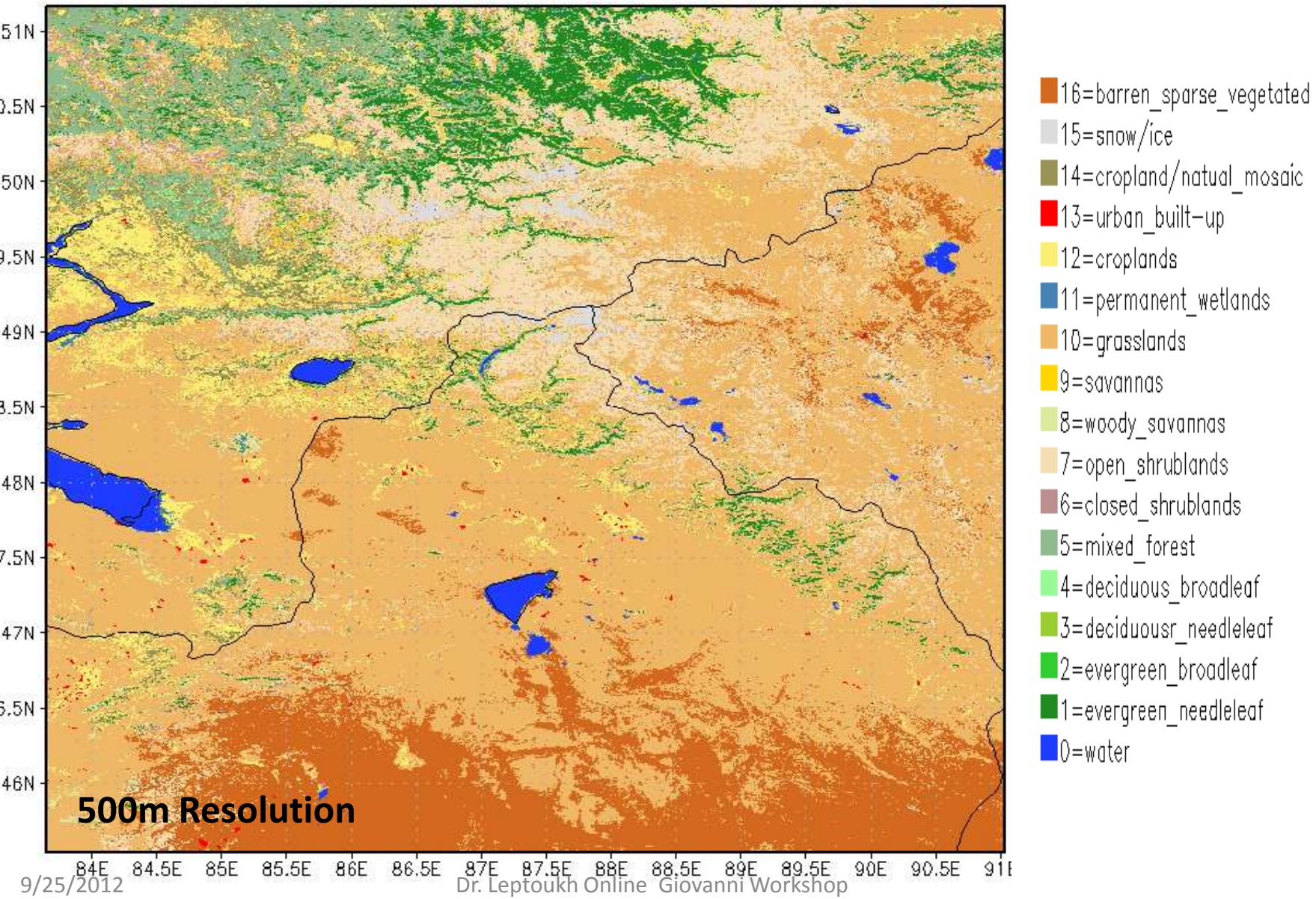
MODIS Land Cover Types at 5.6km Resolution

MCD12C1.005 Majority Land Cover Types (IGBP) 5.6km [class]
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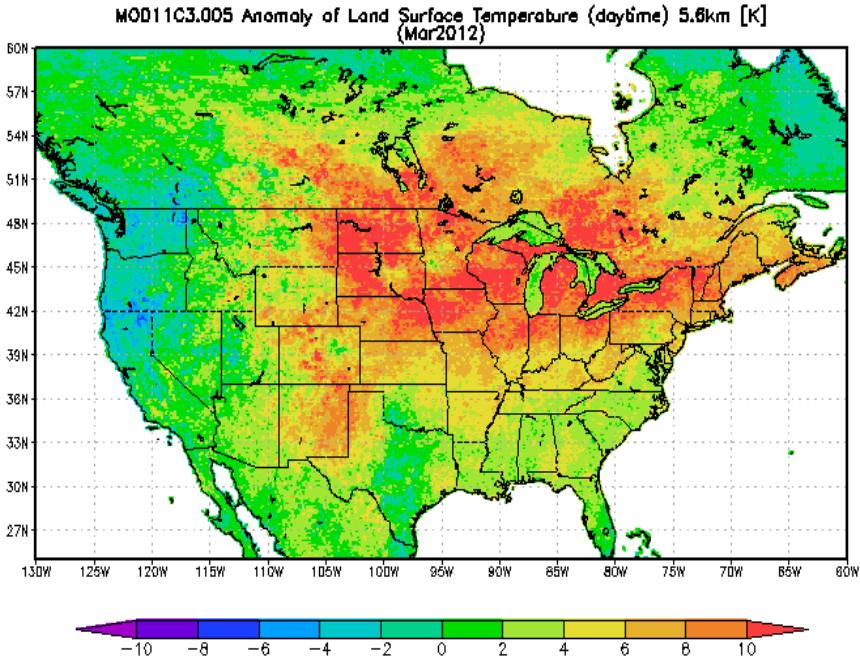


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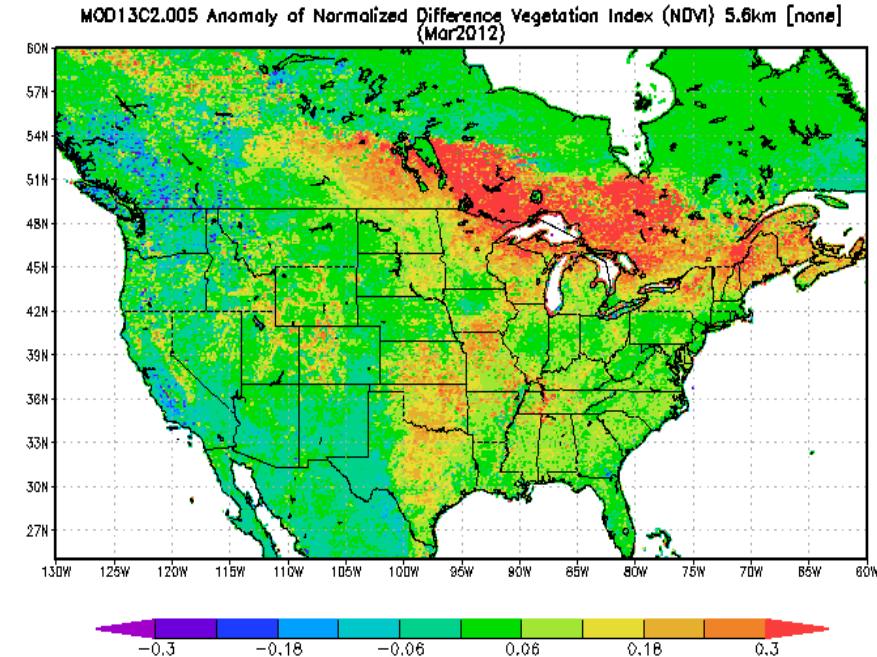
MODIS Land Cover Types at 500m Resolution



Anomalous Surface Temperatures and Greenness Over Northern American in Early Spring 2012

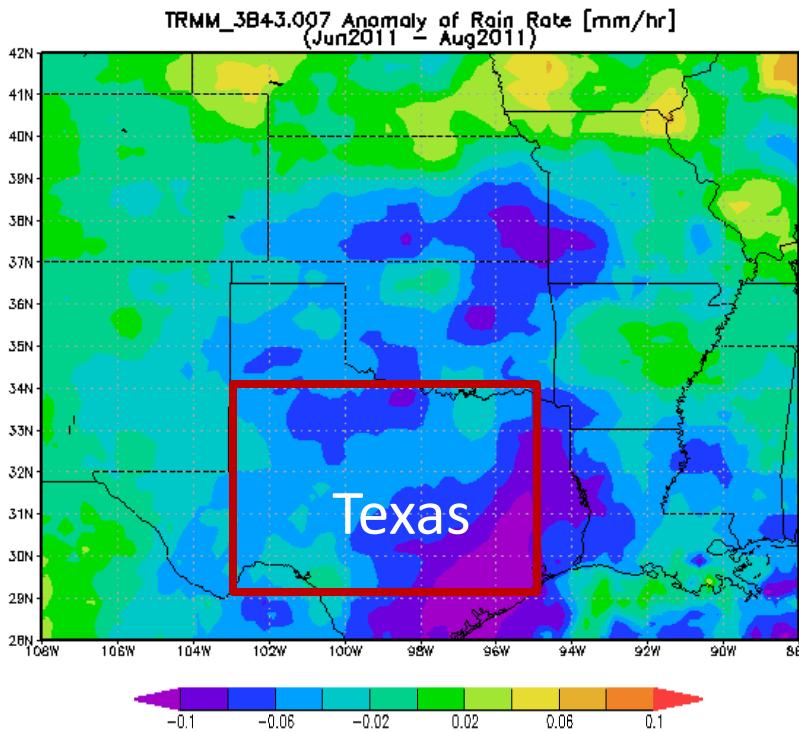


MODIS-Terra land surface temperature anomaly, March 2012, 0.05deg resolution

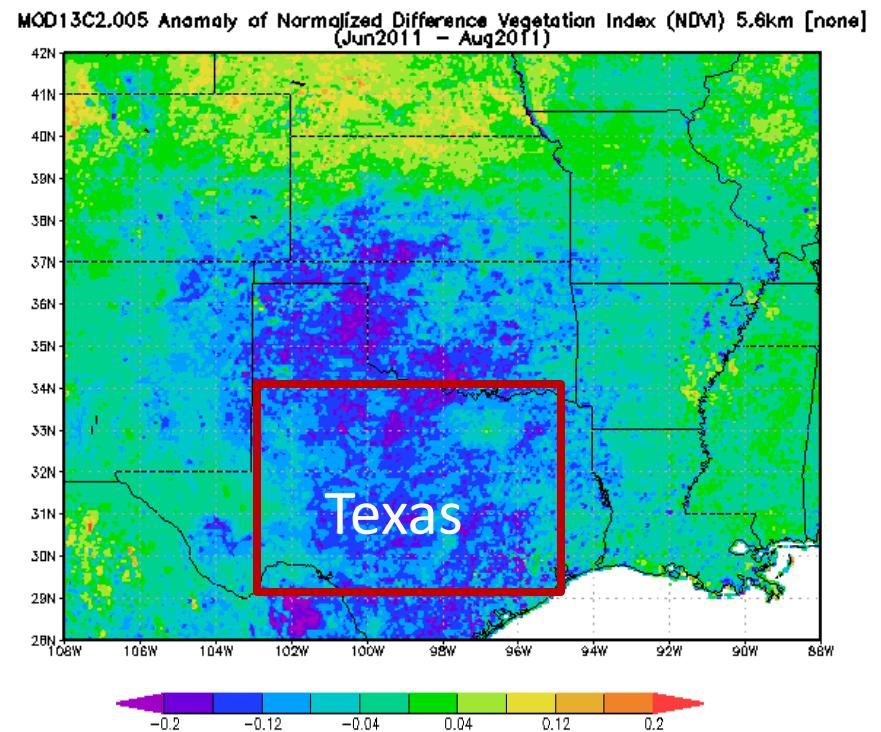


MODIS-Terra NDVI anomaly, March 2012, 0.05 deg resolution

Drought and Weaker Vegetation Index over American Southwest in Summer 2011

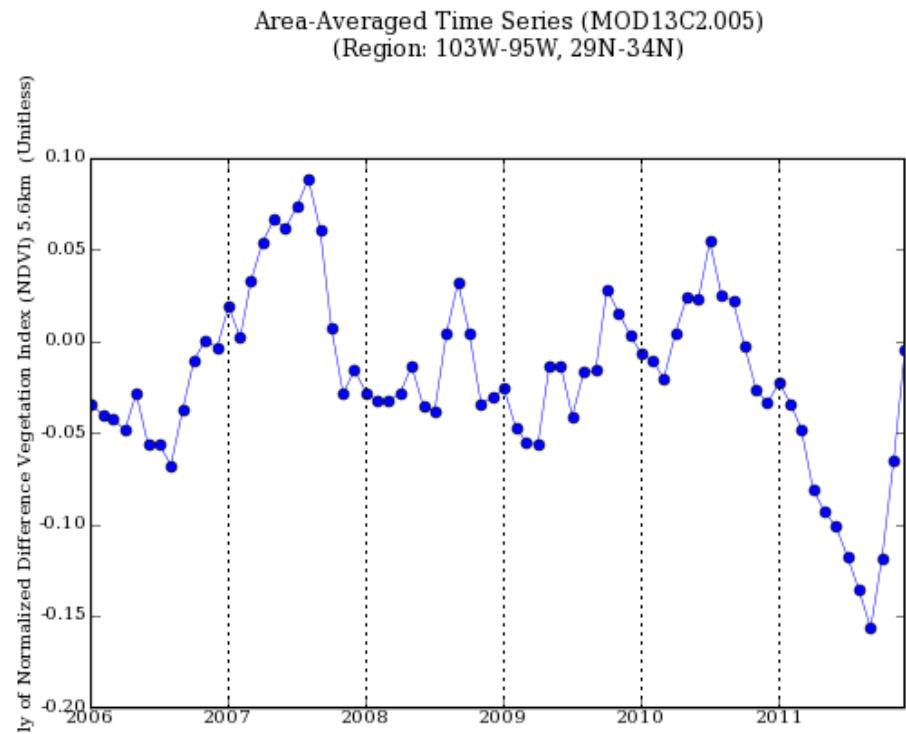
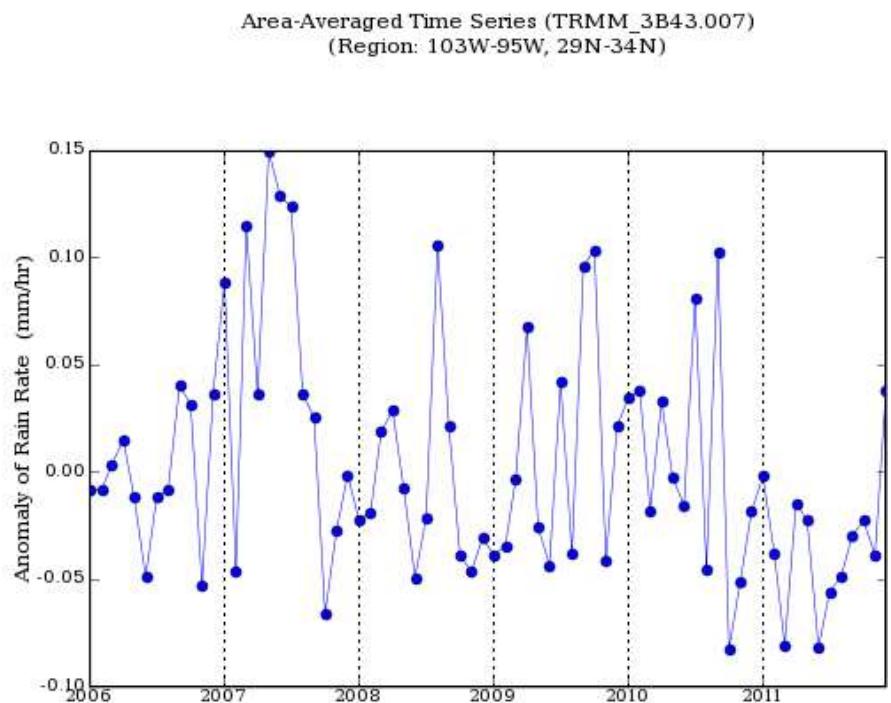


TRMM Precipitation rate anomaly,
Jun-Aug 2011, 0.25 deg resolution

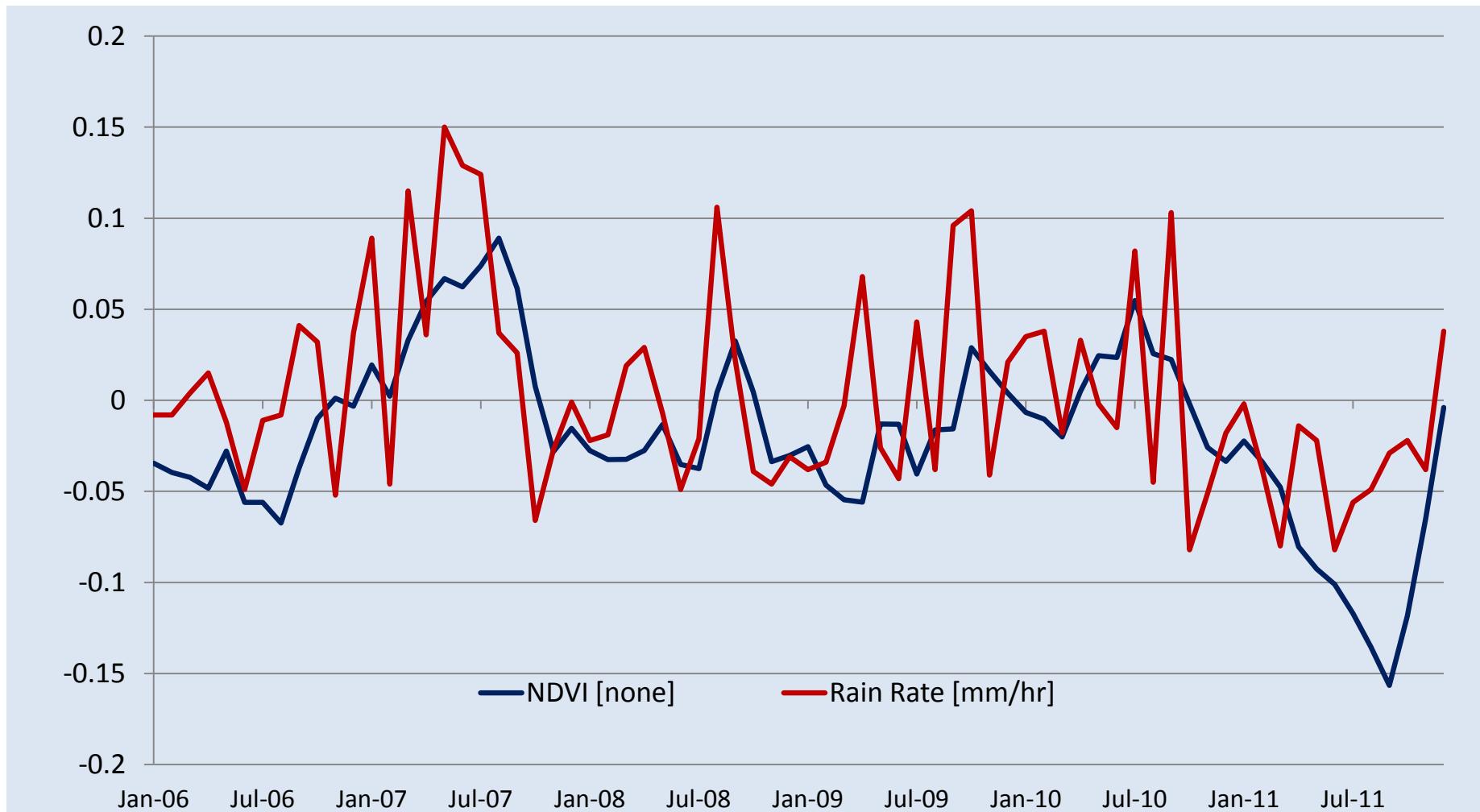


MODIS-Terra NDVI anomaly, Jun-Aug
2011, 0.05deg resolution

Time Series of Monthly Anomaly TRMM Precipitation and MODIS-Terra NDVI

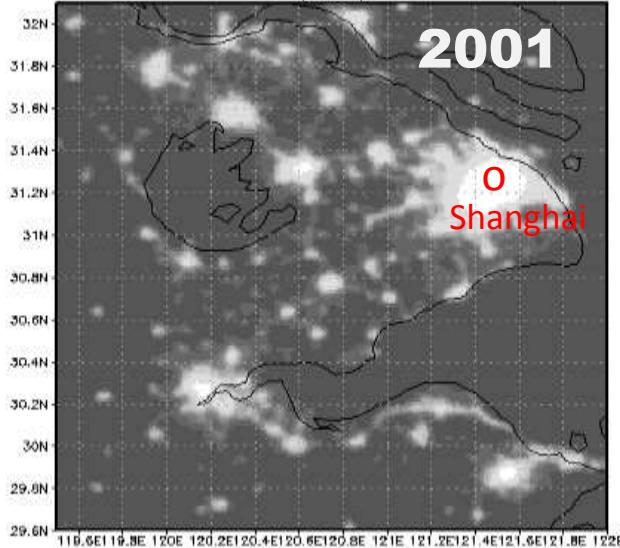


Time Series of Monthly Anomaly TRMM Precipitation and MODIS-Terra NDVI

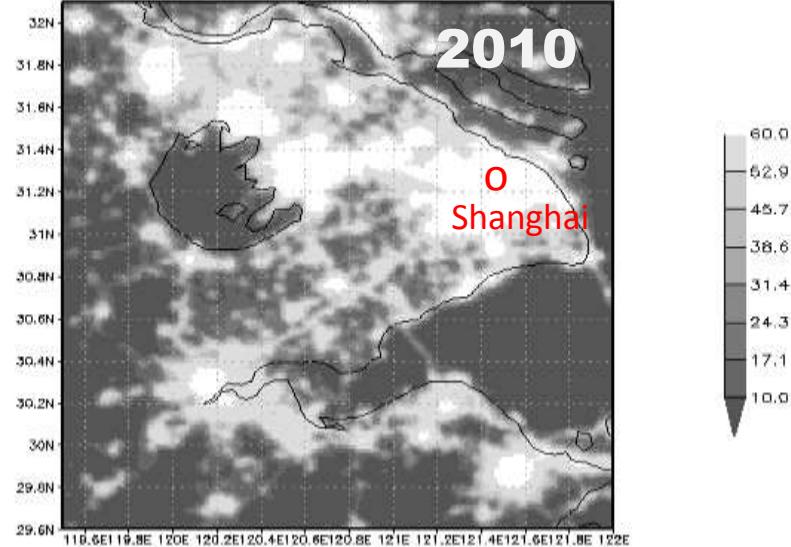


Exploring Urban Heat Island Effect

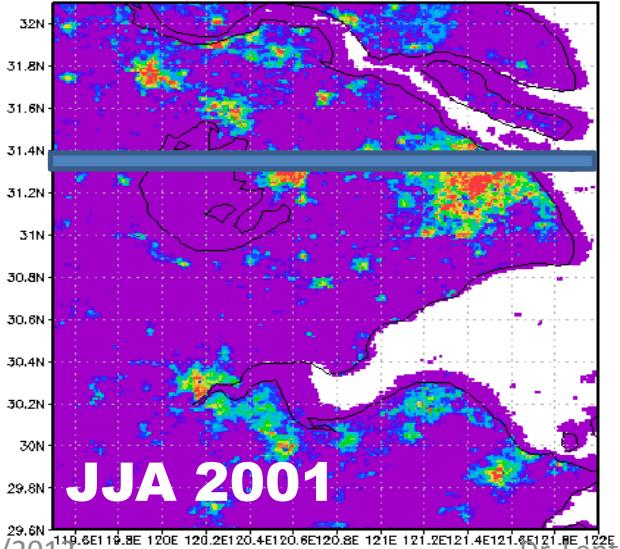
F15NLGT_MAIRS.004 Stable Nighttime Lights 1km F15 [none] (2001)



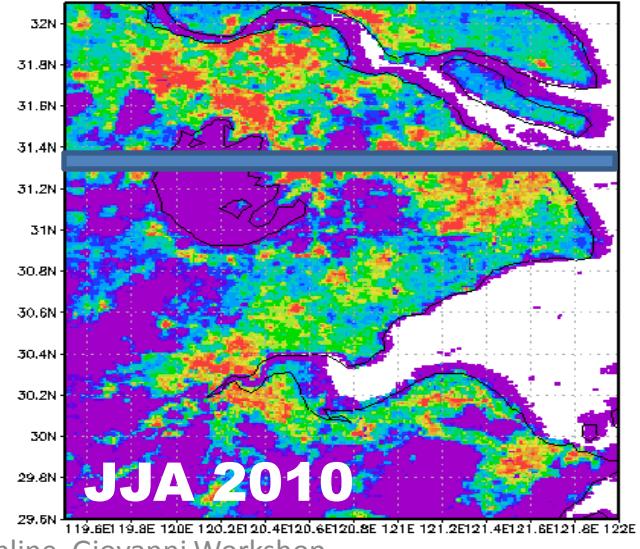
F18NLGT_MAIRS.004 Stable Nighttime Lights 1km F18 [none] (2010)



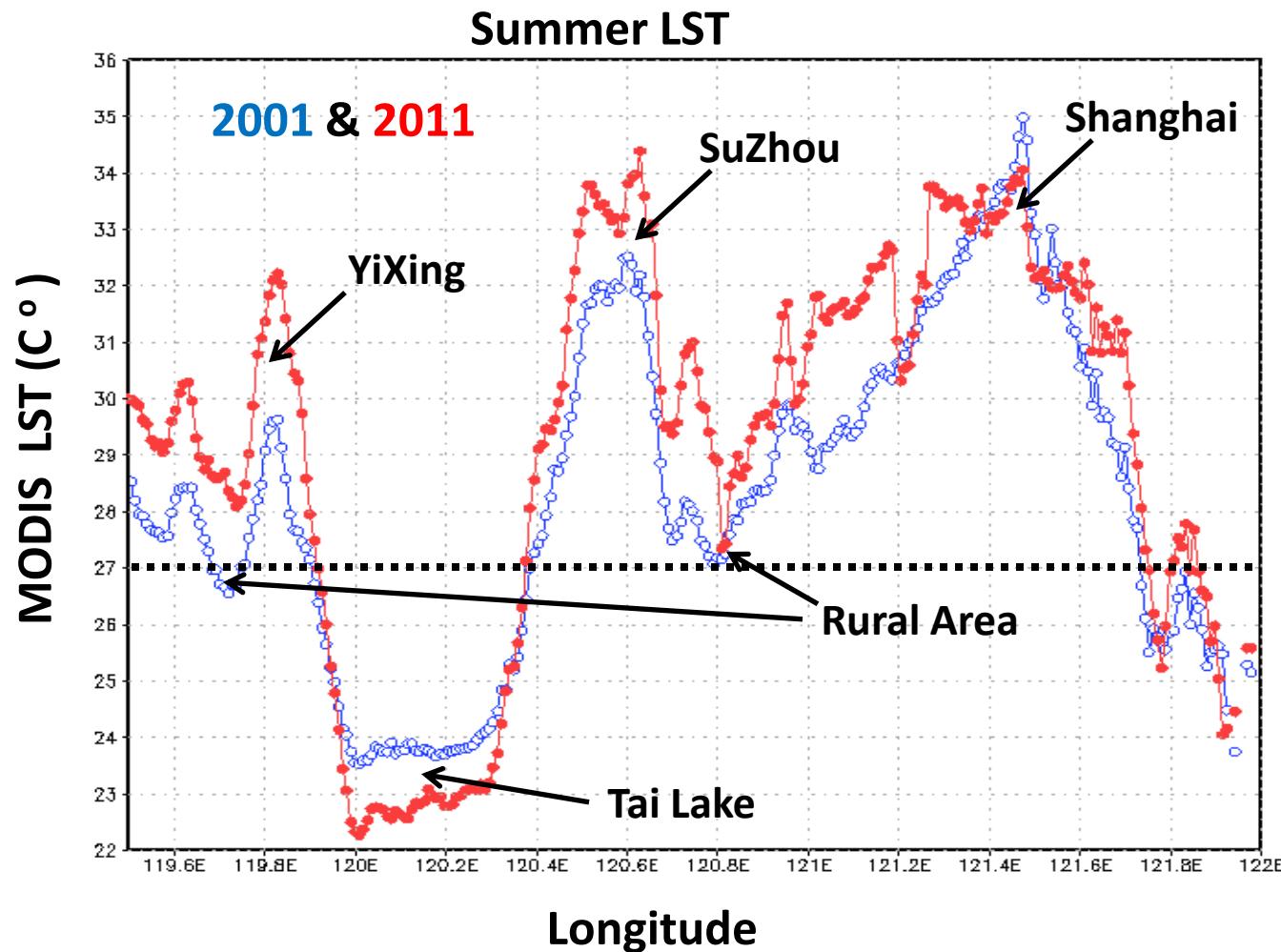
MOD11A2_MAIRS.005 Land Surface Temperature 1km (day) [K] (25May2001 – 29Aug2001)



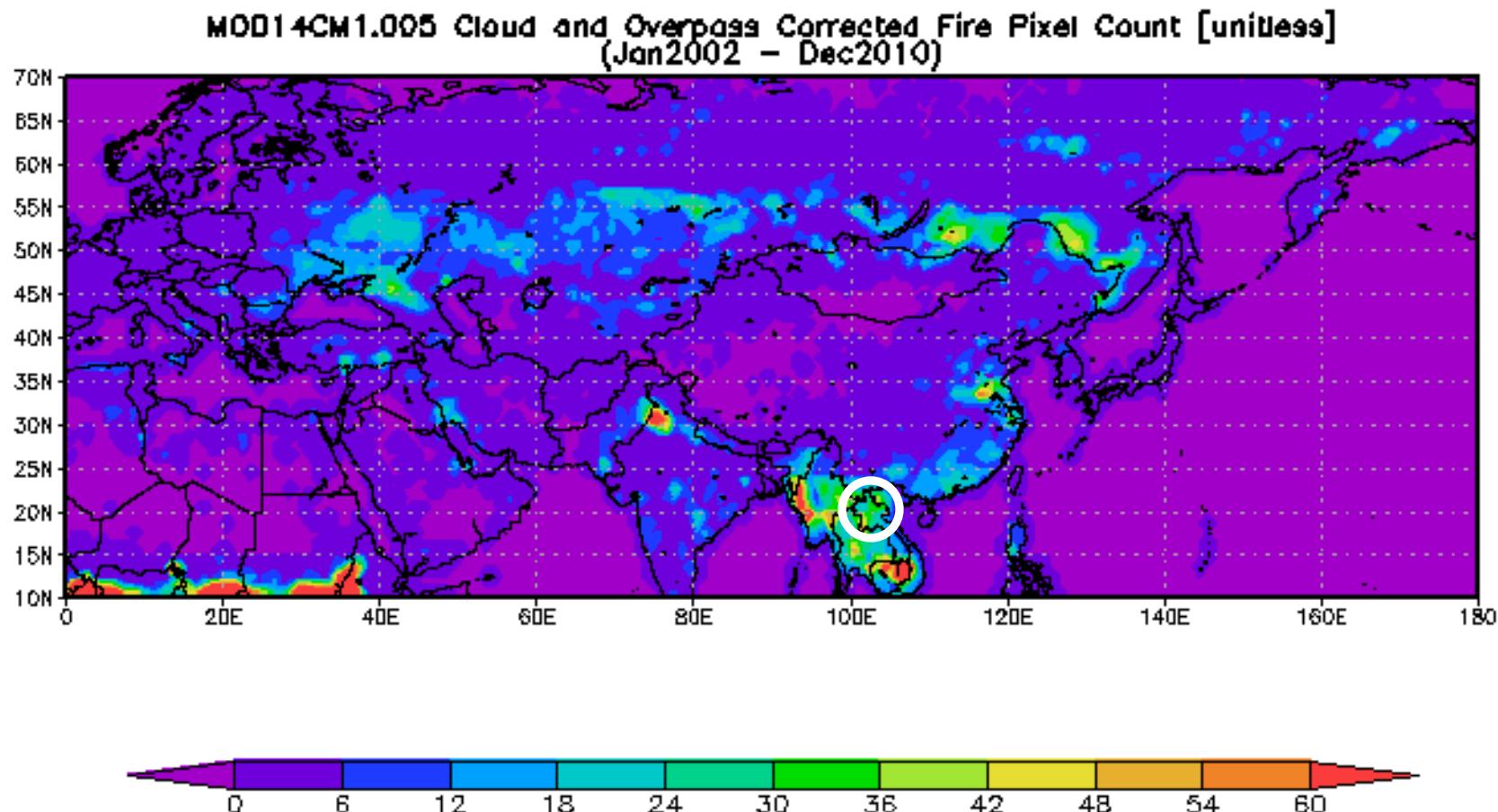
MOD11A2_MAIRS.005 Land Surface Temperature 1km (day) [K] (25May2010 – 29Aug2010)



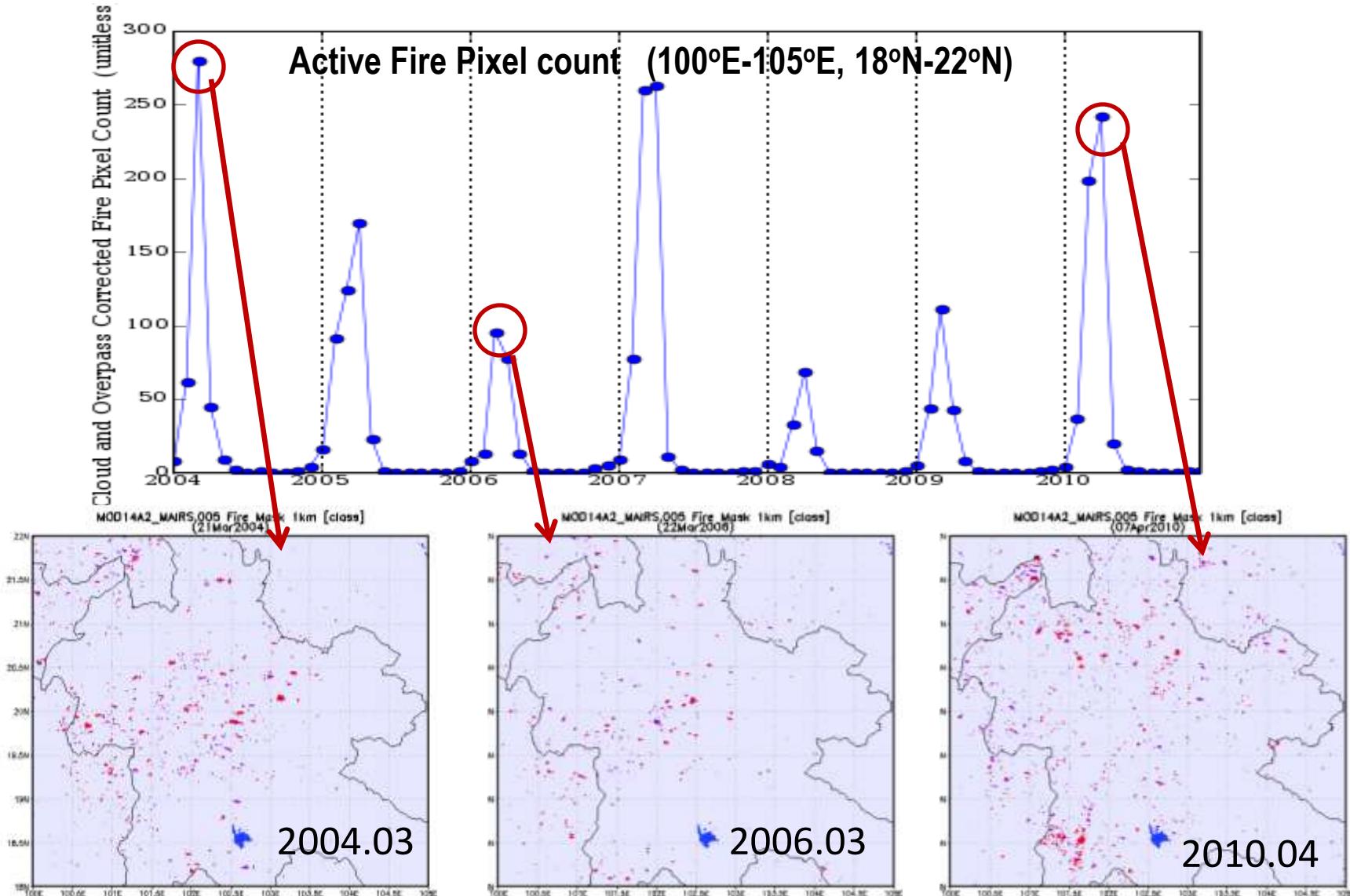
Exploring Urban Heat Island Effect – Continue



Averaged Active Fire Pixel Counts (2002-2010)



Interannual Variations of Fires over South Asia



Locations of Active Fire Mask at 1km Resolution

Giovanni Land Portals:

<http://disc.gsfc.nasa.gov/giovanni>

→ Application and Education portals

Project Portals:

GES DISC MAIRS: <http://disc.gsfc.nasa.gov/mairs>

GES DISC NEESPI: <http://disc.gsfc.nasa.gov/neespi>